

# **Cotton Gin Operating Costs in West Texas, the Lower Rio Grande Valley, and the Blacklands of Texas, 1971 and 1972 Seasons**



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#### ABSTRACT

Capacity utilization and operating costs were analyzed for a sample of 90 gins representing about 19 percent of both total ginning capacity and total volume ginned in West Texas, the Lower Rio Grande Valley, and the Blacklands of Texas. Average ginning volumes were up in 1972. Compared to 1971, the 1972 weighted average total costs per bale were down 20 percent in West Texas, down 2 percent in the Lower Rio Grande Valley, and down 8 percent in the Blacklands. Out-of-pocket costs per bale were lower in West Texas, higher in the Lower Rio Grande Valley, and lower in the Blacklands. A stepwise multiple linear regression analysis reveals that volume ginned and investment in buildings and equipment are the most influential factors in determining annual gin operating costs.

Keywords: Cotton, ginning, costs, capacity, utilization.

#### PREFACE

This report is part of a series of ginning cost studies in the major producing areas of the Cotton Belt conducted by the U. S. Department of Agriculture. It covers three selected areas of Texas--West Texas, the Lower Rio Grande Valley, and the Blacklands. Similar studies are being conducted in the Midsouth and the San Joaquin Valley of California.

Objectives of the research are to (1) determine the current cost of ginning for each selected area and observe trends and changes over time, (2) analyze the effects of changes in ginning volumes on ginning costs, and (3) consider the possibilities of reducing operating costs through more efficient ginning.

Findings are derived from gin operating cost records mailed in annually from a sample of gins in each area. Area ginners use these findings as benchmarks or guides in evaluating the efficiencies of their own operations.

Appreciation is extended to gin owners, managers, and accountants for their cooperation and assistance. Statistical analyses of ginning volume and cost data were carried out using computer facilities at the University of Arizona.

# COTTON GIN OPERATING COSTS IN WEST TEXAS, THE LOWER RIO GRANDE VALLEY, AND THE BLACKLANDS OF TEXAS, 1971 and 1972 SEASONS

by

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## INTRODUCTION

Continuous studies on gin operating cost have been carried on for varying lengths of time in three major producing areas of Texas. In West Texas this study series commenced with the 1965/66 ginning season, while in the Lower Rio Grande Valley and the Blacklands similar studies have been carried on only for the past two consecutive years. In prior years, the findings in each area were reported separately. This year all three areas have been combined into one report. To facilitate a comparison of three geographic areas in the same report, each with a different growing season and harvest period, reference to a specific ginning season denotes the year in common when the first bale in each of the areas was ginned. This is different from the previous reports for West Texas and the Blacklands when split year designations were employed to indicate that the ginning season in each of those two areas normally encompasses portions of two calendar years.

The gin sample in each area is stratified into four size groups, based on rated hourly capacities of the gin stand complexes. For West Texas and the Lower Rio Grande Valley these are: Group 1, 8 bales or less; group 2, 9 to 11 bales, group 3, 12 to 20 bales; and group 4, 21 bales or more. Due to a predominance of smaller gin plants in the Blacklands, the four size groups in this area are as follows: Group 1, 6 bales or less; group 2, 7 and 8 bales; group 3, 9 to 11 bales; and group 4, 12 bales or more. Size and content of each of the gin samples vary from year to year, mainly because periodic plant modifications frequently alter capacities. This necessitates an annual review, including reclassification of some plants into other size groups and the filling of voids thus created.

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1/ Shaw and Wilmot are agricultural economists; Heron is an economic assistant.

During the 1972 ginning season, cost data were collected from a sample of 43 gins in West Texas, 20 gins in the Lower Rio Grande Valley, and 27 gins in the Blacklands. Although the ratios of total ginning capacities and total bales ginned for the sample plants compared to the total gin plant population varied among areas, these 90 gins represented 18-1/2 percent of the total ginning capacity and a little over 19 percent of the total bales ginned for all three areas combined.

## FINDINGS

Among the sample gins, average volumes ginned were higher during the 1972 season in all three areas, with the greatest increase, 81 percent, in the average volume for size group 4 in the Blacklands (table 1). The average volume increase for all groups combined ranged from a high of 78 percent for West Texas to a low of 12 percent in the Lower Rio Grande Valley. Larger ginning volumes in 1972 resulted in correspondingly higher plant capacity utilization rates in each area. Capacity utilization in the sample gins, by area averages, climbed from 32 to 54 percent in West Texas, and from 36 to 51 percent in the Blacklands. The increase in plant capacity utilization in the Lower Rio Grande Valley (from 43 to 47 percent ) was less pronounced.

### Costs per Bale at Actual Rates of Capacity Utilization 2/

Compared to 1971, the 1972 weighted average total costs, by areas, were: West Texas--\$26.14 per bale, a drop of 20 percent; Lower Rio Grande Valley--\$23.22 per bale, a decrease of 2 percent; and the Blacklands--\$22.98 per bale, a decline of 8 percent (tables 2-4). The relatively greater per bale cost reduction noted in West Texas was due to the increase in volume ginned combined with a substantial reduction from the previous year in the weight of seed cotton required to produce a bale of lint.

Standardized sample gin cost averages followed the same general pattern as total costs in 1972, ranging from a high of \$29.35 per bale in West Texas to a low of \$25.45 per bale in the Blacklands.

Out-of-pocket costs in 1972 were highest in West Texas (\$23.23 per bale) and lowest in the Lower Rio Grande Valley (\$20.52 per bale). Compared with last season, out-of-pocket costs per bale were \$3.82 lower in West Texas, and \$1.35 lower in the Blacklands. In the Lower Rio Grande Valley, however, out-of-pocket costs were \$0.30 per bale higher despite average volume increases of 589 bales per gin in that area. Individual items making up 1972 weighted average out-of-pocket costs were all lower in West Texas except for bagging and ties, which increased \$0.13 per bale over costs in 1971. In the Blacklands, bagging and tie costs climbed \$0.16 per bale and miscellaneous costs rose \$0.01. During the same period, per bale costs for all other items decreased. Due to a relatively small increase in volume and a general rise in

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2/ Taken from gin records and subjected to uniform allocation procedures as outlined in the appendix.

Table 1--Rated hourly capacities, volumes ginned, and capacity utilization, by ranges and averages for sample gins, West Texas, Lower Rio Grande Valley, and Blacklands of Texas, 1971 and 1972

Gin size group by areas	1971						1972					
	Rated hourly capacity <u>1/</u>		Annual volume ginned		Rate of capacity utilization <u>2/</u>		Rated hourly capacity <u>1/</u>		Annual volume ginned		Rate of capacity utilization <u>2/</u>	
	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.	Range	Avg.
	- - - - - Bales - - - - - - - - - Percent -						- - - - - Bales - - - - - - - - - Percent -					
<u>West Texas</u>												
Group 1....	7- 8	7.6	1067- 4106	1920	18- 67	33	7- 8	7.5	1017- 7166	3061	17-116	53
Group 2....	9-11	9.7	1456- 5114	2909	21- 60	39	9-11	9.9	1872- 9060	4626	27-118	61
Group 3....	12-20	15.0	2000- 4723	3243	19- 42	28	12-20	15.0	2637- 7494	5114	24- 70	44
Group 4....	21-60	32.5	2785-11324	7838	11- 63	31	21-60	32.2	3870-24557	13817	16-145	56
Combined.	7-60	16.7	1067-11324	4131	11- 67	32	7-60	17.6	1017-24557	7345	16-145	54
<u>Lower Valley</u>												
Group 1....	8- 8	8.0	1611- 2687	2140	26- 44	35	8- 8	8.0	2005- 4812	3408	33- 78	55
Group 2....	9-11	9.0	1174- 3481	2285	17- 50	33	9-11	9.0	1572- 3701	2598	23- 53	37
Group 3....	12-20	16.1	1691- 7937	5047	12- 59	41	12-20	16.1	2258- 7949	5577	15- 62	45
Group 4....	21-30	26.8	4711-14739	10939	25- 70	53	21-30	26.8	4842-14606	10924	26- 73	53
Combined.	8-30	15.3	1174-14739	5096	12- 70	43	8-30	15.6	1572-14606	5685	15- 78	47
<u>Blacklands</u>												
Group 1....	5- 6	5.8	1336- 2478	1860	35- 54	42	5- 6	5.8	863- 3400	2332	19- 74	52
Group 2....	7- 8	7.4	768- 4467	2353	14- 83	41	7- 8	7.1	1373- 6719	3552	25-125	65
Group 3....	9-11	9.4	1315- 3692	2292	17- 48	32	9-11	9.3	1170- 5845	3513	15- 76	49
Group 4....	12-15	13.0	1635- 2917	2193	18- 25	22	12-18	13.8	2584- 7244	3968	25- 63	37
Combined.	5-15	8.2	768- 4467	2251	14- 83	36	5-18	8.6	863- 7244	3395	15-125	51

1/ Based on observations in plants operating under normal conditions.

2/ Ratio of volume ginned to estimated total seasonal ginning capacity, without seed cotton storage. Based on typical ginning season of 906 operating hours and a sustained seasonal ginning rate capability set at 85 percent of rated capacity. Several of the sample gins stored seed cotton either in the field or on the gin yard. This practice, in effect, extends the ginning season and makes it possible to exceed 100 percent capacity utilization.

Table 2--Costs per bale in sample gin plants by size group, and average for all plants, West Texas, 1971 and 1972 1/

Cost item and year <u>2/</u>	Group 1		Group 2		Group 3		Group 4		Wgt.
	Range <u>3/</u>	Avg.	Range <u>3/</u>	Avg.	Range <u>3/</u>	Avg.	Range <u>3/</u>	Avg.	avg. <u>4/</u>
	----- Dollars -----								
<u>1971</u>									
Management....	1.77-14.56	5.97	3.39- 6.84	4.34	2.17- 5.20	3.94	1.35- 5.55	3.16	4.18
Insurance.....	.28- 1.60	.68	.34- .98	.57	.49- 1.09	.65	.22- .96	.48	.59
Taxes.....	.25- 1.32	.71	.14- 1.20	.57	.23- .69	.44	.13- 1.36	.53	.55
Energy.....	1.86- 4.10	2.62	.87- 4.92	2.19	1.98- 3.90	2.73	1.93- 4.22	2.80	2.58
Labor.....	7.00- 9.70	8.00	6.00-10.36	7.06	5.36- 8.56	7.13	4.82-10.22	7.10	7.24
Bagging & ties	3.05- 3.85	3.40	3.28- 3.81	3.47	3.31- 3.64	3.49	2.87- 3.78	3.55	3.49
Repairs.....	2.55- 6.48	4.32	2.79- 6.62	4.86	2.34- 7.14	4.80	2.75-11.14	6.56	5.21
Miscellaneous.	1.38- 5.50	2.87	1.22- 8.67	3.78	1.65- 5.50	3.20	1.53- 4.14	2.86	3.22
Out-of-pocket subtotal <u>5/</u>	20.82-41.16	28.58	21.94-35.78	26.84	23.96-29.31	26.38	19.05-35.67	27.03	27.05
Depreciation..	1.17- 9.12	3.70	.64- 9.80	3.28	2.23- 9.66	5.88	2.91-13.46	4.95	4.53
Interest.....	0 - 4.90	1.54	0 - 8.45	.86	0 - 3.42	1.08	0 - 2.60	.73	1.00
Total.....	24.23-47.46	33.81	23.51-42.83	30.98	27.36-40.74	33.35	23.65-45.38	32.71	32.57
<u>Standardized 6/</u>									
Depreciation..	3.37-14.22	5.74	1.55- 8.51	4.61	3.87-10.38	6.75	4.72-17.24	7.17	6.09
Interest.....	2.16- 9.03	3.78	1.15- 5.63	3.02	2.50- 6.30	4.25	2.86-10.62	4.37	3.85
Total <u>7/</u> ....	26.96-56.56	38.10	26.39-49.92	34.47	32.61-45.26	37.38	27.00-59.22	38.58	36.99
<u>1972</u>									
Management....	.99-18.06	4.46	1.50- 6.26	3.41	2.59- 4.50	3.24	1.18- 4.31	2.18	3.16
Insurance.....	.29- 1.44	.66	.28- 1.01	.45	.31- .66	.45	.18- .71	.44	.48
Taxes.....	.16- 1.72	.55	.09- 1.44	.39	.15- .52	.31	.06- 1.02	.32	.38
Energy.....	1.75- 4.12	2.77	1.36- 4.70	2.26	1.66- 3.60	2.32	1.55- 3.20	2.30	2.37
Labor.....	6.30-11.24	8.19	5.71- 9.91	6.96	3.14- 9.65	6.77	4.69- 8.47	6.44	6.95
Bagging & ties	3.29- 3.87	3.65	3.33- 3.89	3.54	3.45- 3.77	3.62	3.44- 3.93	3.68	3.62
Repairs.....	1.65- 6.36	3.42	1.85- 7.46	3.76	1.10- 4.12	3.26	2.27- 6.49	4.10	3.68
Miscellaneous.	1.54- 6.44	2.47	1.07- 6.43	3.12	1.49- 5.52	2.88	1.02- 4.82	1.96	2.60
Out-of-pocket subtotal <u>5/</u>	20.84-45.89	26.16	18.93-31.32	23.88	20.20-27.81	22.87	17.85-26.71	21.42	23.23
Depreciation..	1.02- 4.59	2.25	.67- 3.46	1.52	1.49- 5.73	3.35	1.47- 9.62	2.66	2.45
Interest.....	0 - 6.10	.98	0 - 5.42	.24	0 - .91	.34	0 - 1.59	.47	.45
Total.....	24.58-54.23	29.39	20.14-36.73	25.64	23.90-29.34	26.56	19.70-36.75	24.55	26.14
<u>Standardized 6/</u>									
Depreciation..	1.87- 7.87	3.81	1.62- 6.82	2.90	2.52- 7.60	4.35	2.13-12.43	3.98	3.75
Interest.....	1.27- 5.00	2.49	1.05- 4.49	1.90	1.62- 4.66	2.74	1.29- 7.65	2.43	2.37
Total <u>7/</u> ....	23.98-57.40	32.46	21.60-40.85	28.68	27.11-32.45	29.95	21.34-46.78	27.83	29.35

Individual cost items may not add to totals because of rounding.

1/ Rated hourly ginning capacity: Group 1, 8 bales or less; group 2, 9 to 11 bales; group 3, 12 to 20 bales; group 4, 21 bales or more. The universe includes all active gins in the study area. 2/ Taken from gin records and subjected to uniform allocation procedures--see appendix. 3/ Low and high values shown for individual cost items indicate ranges among sample gins within a size group. Since the same gin plant was not consistently lowest or highest for all cost items, individual costs will not add to totals shown. 4/ Sample averages across groups, weighted by each group's representative proportion of the total rated hourly ginning capacity in the study area gin universe. 5/ Sample gin cost excluding depreciation and interest. 6/ Sample gin costs using uniform rates in computing depreciation and interest--see appendix. 7/ Out-of-pocket costs plus standardized depreciation and standardized interest.

Table 3--Costs per bale in sample gin plants by size group, and average for all plants, Lower Rio Grande Valley of Texas, 1971 and 1972 1/

Cost item and year <u>2/</u>	Group 1			Group 2			Group 3			Group 4			Wgt. avg. <u>4/</u>
	Range <u>3/</u>	Avg.		Range <u>3/</u>	Avg.		Range <u>3/</u>	Avg.		Range <u>3/</u>	Avg.		
	----- Dollars -----												
<u>1971</u>													
Management....	1.78- 6.97	4.61		1.56- 6.64	4.13		2.54- 7.52	3.74		2.07- 4.71	3.14		3.78
Insurance.....	.62- .96	.74		.54- 3.55	1.24		.26- 1.55	.50		.11- 1.13	.35		.60
Taxes.....	.42- 1.25	.73		.64- 2.25	1.14		.27- 1.33	.66		.12- .91	.38		.67
Energy.....	1.65- 3.02	2.11		.83- 1.83	1.42		.85- 3.05	1.38		1.16- 1.81	1.50		1.52
Labor.....	3.28- 9.45	5.96		2.45- 8.54	4.76		2.58- 7.57	3.93		3.10- 5.28	4.34		4.44
Bagging & ties	3.82- 3.82	3.82		3.65- 3.82	3.76		3.82- 3.93	3.85		3.82- 3.91	3.83		3.83
Repairs.....	2.18- 2.34	2.27		2.01- 7.08	3.64		1.23- 4.15	2.56		1.52- 3.04	2.01		2.54
Miscellaneous.	2.12- 5.63	3.16		1.83- 4.33	2.45		1.56- 4.36	2.70		1.62- 4.30	3.18		2.84
Out-of-pocket subtotal <u>5/</u>	16.11-32.71	23.41		18.40-31.39	22.54		14.55-31.49	19.31		16.08-23.64	18.74		20.22
Depreciation..	2.04- 2.17	2.11		.40- 5.73	2.78		1.34- 6.01	3.02		1.77- 1.93	1.85		2.58
Interest.....	.07- 3.16	1.22		.05- 4.17	.95		0 - 2.73	.67		.01- 1.77	.78		.81
Total.....	18.22-38.02	26.73		21.39-39.79	26.27		18.36-35.78	23.01		18.02-25.76	21.36		23.62
<u>Standardized 6/</u>													
Depreciation..	1.63- 4.91	3.30		3.58-19.78	7.38		2.58-10.13	5.05		2.31- 6.80	3.92		4.85
Interest.....	1.29- 3.40	2.33		2.37-12.26	4.69		1.76- 6.27	3.15		1.46- 4.23	2.42		3.07
Total <u>7/</u> ....	19.04-41.02	29.04		26.89-63.43	34.61		18.89-44.32	27.51		21.18-31.37	25.08		28.14
<u>1972</u>													
Management....	2.15- 6.70	3.49		1.75- 5.39	3.67		2.17- 5.64	3.32		2.01- 5.01	3.11		3.36
Insurance.....	.58- .66	.60		.51- 1.67	.99		.27- .78	.51		.51- .95	.65		.62
Taxes.....	.43- .79	.68		.68- 1.95	1.18		.31- 1.59	.69		.15- .96	.46		.71
Energy.....	1.53- 2.11	1.70		1.00- 1.78	1.42		.90- 2.82	1.43		1.03- 1.72	1.43		1.48
Labor.....	3.15- 7.28	4.37		4.79- 7.00	5.65		2.92- 7.38	4.22		4.37- 5.99	5.15		4.63
Bagging & ties	3.86- 3.89	3.87		3.71- 3.89	3.84		3.74- 3.96	3.87		3.88- 4.02	3.96		3.88
Repairs.....	1.89- 2.33	2.20		2.34- 7.21	4.47		1.95- 6.50	3.00		1.95- 5.90	3.06		3.05
Miscellaneous.	2.05- 3.67	3.20		2.15- 5.76	3.18		1.47- 3.48	2.46		2.03- 4.51	2.87		2.79
Out-of-pocket subtotal <u>5/</u>	18.07-25.00	20.11		20.58-32.46	24.39		15.88-27.45	19.49		16.85-26.96	20.69		20.52
Depreciation..	.79- 1.34	.95		.54- 5.55	2.35		1.97- 4.02	2.56		.71- 2.02	1.75		2.05
Interest.....	.02- 2.87	.86		.08- 4.11	.83		0 - 1.72	.53		0 - 1.51	.64		.66
Total <u>7/</u> ....	18.87-29.22	21.92		22.44-37.41	27.58		19.29-30.36	22.58		18.83-28.71	23.08		23.22
<u>Standardized 6/</u>													
Depreciation..	1.49- 3.90	2.19		4.24-12.24	6.50		2.43- 6.97	4.83		2.24- 6.63	3.91		4.34
Interest.....	1.05- 2.71	1.54		2.96- 7.58	4.15		1.65- 4.19	3.00		1.42- 4.12	2.41		2.74
Total <u>7/</u> ....	20.60-31.60	23.84		28.32-52.27	35.04		20.83-37.90	27.33		23.23-34.03	27.00		27.60

Individual cost items may not add to totals because of rounding.

1/ Rated hourly ginning capacity: Group 1, 8 bales or less; group 2, 9 to 11 bales; group 3, 12 to 20 bales; group 4, 21 bales or more. The universe includes all active gins in the study area. 2/ Taken from gin records and subjected to uniform allocation procedures--see appendix. 3/ Low and high values shown for individual cost items indicate ranges among sample gins within a size group. Since the same gin plant was not consistently lowest or highest for all cost items, individual costs will not add to totals shown. 4/ Sample averages across groups, weighted by each group's representative proportion of the total rated hourly ginning capacity in the study area gin universe. 5/ Sample gin cost excluding depreciation and interest. 6/ Sample gin costs using uniform rates in computing depreciation and interest--see appendix. 7/ Out-of-pocket costs plus standardized depreciation and standardized interest.

Table 4--Costs per bale in sample gin plants by size group, and average for all plants, Blacklands of Texas, 1971 and 1972 1/

Cost item and year <u>2/</u>	Group 1		Group 2		Group 3		Group 4		Wgt.
	Range <u>3/</u>	Avg.	Range <u>3/</u>	Avg.	Range <u>3/</u>	Avg.	Range <u>3/</u>	Avg.	avg. <u>4/</u>
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<u>Dollars</u>									
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<u>1971</u>									
Management....	2.65- 4.49	3.47	.96- 8.41	3.24	2.14- 6.87	3.93	3.00- 8.22	4.83	3.53
Insurance.....	.38- 1.37	.78	.15- 1.86	.66	.48- 1.89	.92	.31- .73	.57	.71
Taxes.....	.22- .51	.33	.16- .93	.46	.29- 1.13	.66	.44- 1.51	.88	.49
Energy.....	1.83- 3.03	2.61	1.23- 4.08	2.30	.84- 2.89	2.26	2.61- 3.16	2.82	2.42
Labor.....	4.95- 8.59	6.63	4.55-11.36	6.47	5.36-11.54	8.69	5.87- 7.74	7.12	6.87
Bagging & ties	<u>5/</u>	3.82	<u>5/</u>	3.82	<u>5/</u>	3.82	<u>5/</u>	3.82	3.82
Repairs.....	2.80- 3.62	3.05	1.65- 6.92	2.77	1.71- 3.93	2.88	.92- 4.37	2.08	2.79
Miscellaneous.	.35- 1.89	1.22	.49- 3.17	1.34	1.07- 3.19	1.62	1.03- 2.22	1.60	1.37
Out-of-pocket subtotal <u>6/</u>	19.19-22.98	21.91	15.19-32.30	21.06	18.33-28.46	24.77	19.24-31.58	23.72	22.00
Depreciation..	.41- 2.53	1.28	.31- 5.12	2.28	.90- 4.20	2.50	5.37- 7.48	6.19	2.43
Interest.....	0 - .09	.06	.02- 1.37	.36	0 - .49	.27	1.71- 3.58	2.55	.48
Total.....	21.72-24.19	23.25	15.64-36.73	23.70	20.90-33.06	27.55	29.15-41.85	32.46	24.90
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<u>Standardized 7/</u>									
Depreciation..	1.66- 3.99	3.26	1.74-11.21	3.89	1.95- 5.86	4.25	6.51- 8.21	7.45	4.11
Interest.....	1.50- 3.00	2.38	1.26- 7.66	2.63	1.56- 4.05	2.91	4.27- 5.37	4.79	2.80
Total <u>8/</u> ....	22.35-29.65	27.55	20.19-45.87	27.58	21.84-36.63	31.93	30.03-45.16	35.96	28.91
<hr/>									
<u>1972</u>									
Management....	2.19- 5.03	3.26	1.33- 4.88	2.81	.81- 4.29	2.35	2.56- 6.68	4.00	2.95
Insurance.....	.41- 2.27	.97	.07- 1.91	.39	.13- .65	.54	.24- .86	.44	.53
Taxes.....	.16- 1.11	.32	.06- .50	.21	.13- .52	.35	.25- .83	.41	.27
Energy.....	1.92- 2.97	2.45	1.56- 4.08	2.25	.46- 4.04	1.76	2.04- 3.89	2.61	2.26
Labor.....	3.41- 8.36	6.53	3.39-10.73	6.22	5.81- 9.66	7.28	4.89- 8.88	7.20	6.53
Bagging & ties	4.01- 4.42	4.11	3.22- 4.16	3.85	3.74- 4.44	3.99	4.03- 5.69	4.41	3.98
Repairs.....	.49- 3.80	2.70	1.48- 4.63	2.67	1.74- 4.40	2.69	1.44- 5.20	3.52	2.76
Miscellaneous.	.59- 2.44	1.39	.55- 3.68	1.49	.83- 1.85	1.23	.67- 1.30	1.00	1.38
Out-of-pocket subtotal <u>6/</u>	18.27-24.99	21.73	13.88-30.39	19.88	15.38-27.09	20.19	16.63-27.14	23.60	20.65
Depreciation..	.72- 2.57	1.58	.22- 3.73	2.03	.33- 2.30	1.38	1.88- 4.16	2.73	1.92
Interest.....	0 - .14	.05	0 - 1.47	.37	0 - .90	.30	.38- 3.33	1.41	.40
Total.....	19.74-26.75	23.36	17.08-35.59	22.28	15.71-27.89	21.87	21.17-31.76	27.74	22.98
<hr/>									
<u>Standardized 7/</u>									
Depreciation..	1.54- 5.11	2.43	1.12- 7.54	2.91	1.50- 5.81	2.72	1.72- 4.58	3.55	2.86
Interest.....	1.16- 4.03	1.80	.81- 4.90	1.94	1.22- 3.82	1.87	1.32- 3.05	2.33	1.94
Total <u>8/</u> ....	20.98-31.36	25.97	18.40-42.83	24.72	18.37-30.39	24.78	23.55-33.32	29.48	25.45

Individual cost items may not add to totals because of rounding.

1/ Rated hourly ginning capacity: Group 1, 6 bales or less; group 2, 7 and 8 bales; group 3, 9 to 11 bales; group 4, 12 bales or more. The universe includes all active gins in the study area. 2/ Taken from gin records and subjected to uniform allocation procedures--see appendix. 3/ Low and high values shown for individual cost items indicate ranges among sample gins within a size group. Since the same gin plant was not consistently lowest or highest for all cost items, individual costs will not add to totals shown. 4/ Sample averages across groups, weighted by each group's representative proportion of the total rated hourly ginning capacity in the study area gin universe. 5/ To eliminate effects of inventory carryover in 1971, a uniform unit cost for bagging and ties was assumed. 6/ Sample gin costs excluding depreciation and interest. 7/ Sample gin costs using uniform rates in computing depreciation and interest--see appendix. 8/ Out-of-pocket costs plus standardized depreciation and standardized interest.



input costs, the 1972 per bale out-of-pocket costs in the Lower Rio Grande Valley advanced for all items except management, energy, and miscellaneous items. Repair costs led with a \$0.51 per bale increase, followed by a \$0.19 per bale rise in labor costs.

### Costs per Bale Assuming 70-Percent Rate of Capacity Utilization

To allow cost comparisons at the same relative ginning volume levels, each group and the overall weighted average cost were adjusted to a uniform capacity utilization rate of 70 percent (tables 5-7). <sup>3/</sup> This adjustment lowered 1972 costs per bale substantially in all groups and areas, pointing up the beneficial effects of increased volume on unit operating costs for all plant sizes. West Texas again had the highest and the Lower Rio Grande Valley the lowest weighted average costs per bale for each of the three cost categories.

The 1972 estimated costs, when adjusted to 70-percent capacity utilization and compared to 1971, were substantially higher for most items, indicating that input costs rose at a more rapid rate than did productivity resulting from the employment of those inputs. The 1972 weighted average out-of-pocket cost estimates at 70-percent utilization, compared to 1971 were: West Texas--\$21.11 per bale, an increase of 5 percent; Lower Rio Grande Valley--\$17.66, up 8 percent; and the Blacklands--\$19.11 per bale, an advance of 11 percent. Again, this year's reduced seed cotton volume requirements per bale of lint in West Texas were reflected here.

Standardized depreciation and interest cost estimates for all size groups combined at the 70-percent utilization rate, were \$0.03 per bale higher in West Texas and \$0.16 higher in both the Lower Rio Grande Valley and the Blacklands in 1972, compared to depreciation and interest cost estimates in these areas in 1971. These cost increases reflect additional investment in machinery and equipment which does not increase rated ginning capacity. This would include such items as air pollution control and occupational safety equipment.

### GINNING REVENUE

Revenue per bale varies among Texas gins, depending upon the charges for ginning and for bagging and ties, plus the profit margins or losses realized from buying and selling cottonseed and performing associated activities. Many gins assess the grower a fixed charge per hundredweight of seed cotton for ginning and make an additional charge for bagging and ties. An increasing number of gins are making only a per hundredweight charge covering both ginning and bagging and ties.

During the 1972 season, total revenues per bale from all sources for the sample gins, by area averages, were: West Texas, \$31.08; Lower Rio Grande Valley, \$34.57; and the Blacklands, \$31.55 (table 8). Total revenues exceeded total standardized cost averages in all three areas, except for size group 1 in West Texas and size group 2 in the Lower Rio Grande Valley, and surpassed

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<sup>3/</sup> See cost adjustments in the appendix.

Table 5--Estimated costs per bale in sample gin plants at 70-percent capacity utilization, by size group, and average for all plants, West Texas, 1971 and 1972

Cost item <u>2/</u>	1971					1972				
	Group 1	Group 2	Group 3	Group 4	Weighted average	Group 1	Group 2	Group 3	Group 4	Weighted average
	Dollars									
Management.....	3.39	2.86	2.08	1.91	2.25	3.66	3.10	2.41	1.92	2.55
Insurance.....	.38	.37	.33	.28	.33	.52	.41	.33	.38	.39
Taxes.....	.34	.31	.18	.24	.25	.42	.34	.20	.26	.28
Energy.....	2.14	1.89	2.09	2.24	2.08	2.60	2.19	2.08	2.19	2.22
Labor.....	5.55	5.37	4.48	4.77	4.96	7.27	6.56	5.51	5.85	6.16
Bagging and ties....	3.40	3.47	3.49	3.55	3.49	3.65	3.54	3.62	3.68	3.62
Repairs.....	3.29	4.00	3.49	4.96	4.01	3.14	3.61	2.85	3.84	3.40
Miscellaneous.....	2.42	3.35	2.60	2.40	2.73	2.34	3.04	2.64	1.89	2.48
Out-of-pocket subtotal <u>3/</u> .....	20.91	21.63	18.75	20.34	20.10	23.60	22.78	19.63	19.99	21.11
Depreciation.....	1.75	1.82	2.36	2.21	2.09	1.70	1.31	2.12	2.12	1.86
Interest.....	.73	.48	.44	.33	.46	.74	.21	.21	.38	.34
Total.....	23.38	23.93	21.55	22.88	22.66	26.05	24.30	21.97	22.48	23.31
Standardized depreciation <u>4/</u> ....	2.71	2.57	2.71	3.21	2.81	2.88	2.51	2.75	3.17	2.83
Standardized interest <u>4/</u> .....	1.78	1.68	1.70	1.95	1.78	1.88	1.65	1.73	1.93	1.79
Total standardized <u>5/</u> ...	25.40	25.88	23.16	25.50	24.70	28.37	26.94	24.12	25.09	25.74

Individual cost items may not add to total because of rounding.

1/ See appendix for cost adjustments and weighting procedures. Rated hourly ginning capacity: Group 1, 8 bales or less; group 2, 9 to 11 bales; group 3, 12 to 20 bales; group 4, 21 bales or more. The universe includes all active gins in the study area. 2/ Taken from gin records and subjected to uniform allocation procedures--see appendix. 3/ Sample gin costs excluding depreciation and interest. 4/ Sample gin costs using uniform rates in computing depreciation and interest--see appendix. 5/ Out-of-pocket costs plus standardized depreciation and standardized interest.

Table 6--Estimated costs per bale in sample gin plants at 70-percent capacity utilization, by size group, and average for all plants, Lower Rio Grande Valley of Texas, 1971 and 1972 1/

Cost item <u>2/</u>	1971					1972				
	Group 1	Group 2	Group 3	Group 4	Weighted average	Group 1	Group 2	Group 3	Group 4	Weighted average
	Dollars									
Management.....	2.74	2.37	2.62	2.68	2.49	2.96	2.33	2.50	2.65	2.48
Insurance.....	.45	.67	.35	.30	.41	.51	.60	.38	.53	.47
Taxes.....	.36	.53	.38	.29	.39	.54	.63	.44	.35	.48
Energy.....	1.61	1.06	1.11	1.35	1.22	1.55	1.10	1.20	1.29	1.27
Labor.....	4.25	3.30	3.06	3.86	3.45	3.95	4.21	3.46	4.57	3.88
Bagging and ties....	3.82	3.76	3.85	3.83	3.83	3.87	3.84	3.87	3.96	3.88
Repairs.....	1.68	2.64	2.08	1.82	2.04	2.01	3.45	2.55	2.76	2.62
Miscellaneous.....	2.71	2.07	2.43	3.03	2.56	3.06	2.79	2.27	2.74	2.59
Out-of-pocket										
subtotal <u>3/</u> .....	17.62	16.41	15.89	17.16	16.39	18.46	18.96	16.66	18.85	17.66
Depreciation.....	1.05	1.31	1.76	1.40	1.50	.75	1.26	1.65	1.32	1.37
Interest.....	.60	.45	.39	.59	.47	.68	.45	.34	.48	.44
Total.....	19.27	18.17	18.03	19.16	18.36	19.89	20.66	18.65	20.66	19.47
Standardized										
depreciation <u>4/</u> ....	1.64	3.47	2.93	2.98	2.81	1.73	3.48	3.10	2.96	2.91
Standardized										
interest <u>4/</u> .....	1.16	2.21	1.83	1.83	1.78	1.21	2.22	1.93	1.82	1.84
Total										
standardized <u>5/</u> ...	20.41	22.09	20.65	21.97	20.98	21.41	24.66	21.69	23.63	22.41

Individual cost items may not add to total because of rounding.

1/ See appendix for cost adjustments and weighting procedures. Rated hourly ginning capacity: Group 1, 8 bales or less; group 2, 9 to 11 bales; group 3, 12 to 20 bales; group 4, 21 bales or more. The universe includes all active gins in the study area. 2/ Taken from gin records and subjected to uniform allocation procedures--see appendix. 3/ Sample gin costs excluding depreciation and interest. 4/ Sample gin costs using uniform rates in computing depreciation and interest--see appendix. 5/ Out-of-pocket costs plus standardized depreciation and standardized interest.

Table 7--Estimated costs per bale in sample gin plants at 70-percent capacity utilization, by size group, and average for all plants, Blacklands of Texas, 1971 and 1972 <sup>1/</sup>

Cost item <sup>2/</sup>	1971					1972				
	Group 1	Group 2	Group 3	Group 4	Weighted average	Group 1	Group 2	Group 3	Group 4	Weighted average
	----- Dollars -----									
Management.....	2.34	2.20	2.20	2.06	2.14	2.62	2.67	1.83	2.62	2.49
Insurance.....	.51	.43	.48	.26	.43	.75	.37	.41	.29	.44
Taxes.....	.20	.27	.30	.28	.26	.24	.20	.25	.22	.22
Energy.....	2.30	2.02	1.82	2.05	2.04	2.29	2.21	1.62	2.22	2.14
Labor.....	5.25	5.08	5.88	3.81	5.08	5.76	6.04	6.22	5.35	5.92
Bagging and ties..... <sup>3/</sup>	3.82	3.82	3.82	3.82	3.82	4.11	3.85	3.99	4.41	3.98
Repairs.....	2.53	2.32	2.17	1.33	2.27	2.44	2.61	2.41	2.87	2.59
Miscellaneous.....	1.09	1.20	1.35	1.19	1.20	1.31	1.47	1.15	.88	1.33
Out-of-pocket subtotal <sup>4/</sup> .....	18.04	17.34	18.01	14.80	17.25	19.53	19.41	17.87	18.86	19.11
Depreciation.....	.77	1.35	1.13	1.94	1.28	1.18	1.89	.97	1.46	1.53
Interest.....	.04	.21	.12	.80	.25	.04	.34	.21	.75	.32
Total.....	18.85	18.90	19.26	17.53	18.78	20.74	21.64	19.05	21.07	20.96
Standardized depreciation <sup>5/</sup> .....	1.96	2.29	1.92	2.33	2.17	1.81	2.71	1.90	1.89	2.27
Standardized interest <sup>5/</sup> .....	1.43	1.55	1.31	1.50	1.48	1.34	1.80	1.30	1.24	1.54
Total standardized <sup>6/</sup> ...	21.43	21.18	21.25	18.63	20.90	22.68	23.92	21.08	21.99	22.92

Individual cost items may not add to total because of rounding.

<sup>1/</sup> See appendix for cost adjustments and weighting procedures. Rated hourly ginning capacity: Group 1, 6 bales or less; group 2, 7 and 8 bales; group 3, 9 to 11 bales; group 4, 12 bales or more. The universe includes all active gins in the study area. <sup>2/</sup> Taken from gin records and subjected to uniform allocation procedures--see appendix. <sup>3/</sup> To eliminate effect of inventory carryover on costs in 1971, a uniform unit cost for bagging and ties was assumed. <sup>4/</sup> Sample gin costs excluding depreciation and interest. <sup>5/</sup> Sample gin costs using uniform rates in computing depreciation and interest--see appendix. <sup>6/</sup> Out-of-pocket costs plus standardized depreciation and standardized interest.

total cost averages in all three areas for all size groups (table 9). Weighted average profit margins ranged from \$1.73 per bale in West Texas to \$6.97 in the Lower Rio Grande Valley using total standardized costs, and from \$4.94 to \$11.35 per bale for the same two respective areas, based on total costs.

Table 8--Average revenue per bale, by item, at sample gins, West Texas, Lower Rio Grande Valley, and the Blacklands of Texas, 1972

Revenue item	Revenue per bale		
	West Texas	Lower Rio Grande Valley	Blacklands
	<u>Dollars</u>		
Combined ginning and bagging & ties charges...	23.96	24.59	23.22
Cottonseed margin.....	3.59	4.91	5.32
Other <u>1</u> /.....	3.53	5.07	3.01
Total.....	31.08	34.57	31.55

1/ Includes revenue from commissions, motes, loose cotton, green bolls, bur sales, margins on lint cotton and planting seed, regional dividends, and any other miscellaneous income.

If seed margins and other miscellaneous income had been eliminated, however, leaving the charges for ginning and for bagging and ties as the sole sources of revenue, profit margins would have been greatly reduced. Total revenues in this case would have been insufficient to cover total standardized cost averages for any size group in any area except for size group 1 in the Lower Rio Grande Valley and then by only \$0.75 per bale. Losses would have ranged up to \$10.45 per bale for size group 2 in the Lower Rio Grande Valley. Total revenue based on ginning and bagging and ties alone would have been insufficient also to show profit margins above total costs, except for three size groups in the Lower Rio Grande Valley and two size groups in the Blacklands.

#### Regression Analysis

A stepwise, multiple linear regression was run on the combined 1971 and 1972 weighted sample gin data for each area. Multiple regression is a statistical technique for studying the relationship between a dependent and two or more independent variables. Equations resulting from this analysis are useful both in explaining existing relationships and for estimating results using other

Table 9--Profit margin per bale, by revenue sources and costing method, sample gins by size group, West Texas, Lower Rio Grande Valley, and Blacklands of Texas, 1972

Area and gin size group <u>1/</u>	Sources of revenue			
	All sources combined <u>2/</u>		Ginning and bagging and ties charges only	
	Total standardized cost <u>3/</u>	Total cost <u>3/</u>	Total standardized cost <u>3/</u>	Total cost <u>3/</u>
	----- Dollars -----			
<u>West Texas</u>				
Group 1.....	-1.38	1.69	-8.50	-5.43
Group 2.....	2.40	5.44	-4.72	-1.68
Group 3.....	1.13	4.52	-5.99	-2.60
Group 4.....	3.25	6.53	-3.87	-0.59
Weighted average.	1.73	4.94	-5.39	-2.18
<u>Lower Valley</u>				
Group 1.....	10.73	12.65	0.75	2.67
Group 2.....	-0.47	6.99	-10.45	-2.99
Group 3.....	7.24	11.99	-2.74	2.01
Group 4.....	7.57	11.49	-2.41	1.51
Weighted average.	6.97	11.35	-3.01	1.37
<u>Blacklands</u>				
Group 1.....	5.58	8.19	-2.75	-0.14
Group 2.....	6.83	9.27	-1.50	0.94
Group 3.....	6.77	9.68	-1.56	1.35
Group 4.....	2.07	3.81	-6.26	-4.52
Weighted average.	6.10	8.57	-2.23	0.24

1/ Rated hourly ginning capacity, West Texas and the Lower Valley: Group 1, 8 bales or less; group 2, 9 to 11 bales; group 3, 12 to 20 bales; group 4, 21 bales or more; Blacklands, group 1, 6 bales or less; group 2, 7 and 8 bales; group 3, 9 to 11 bales; group 4, 12 bales or more.

2/ Includes cottonseed margins and revenue from commissions, notes, loose cotton, green bolls, bur sales, margins on lint cotton and planting seed, regional dividends and other miscellaneous income in addition to ginning and bagging and ties charges.

3/ See costing methods in the appendix.

value combinations for the variables specified. Gin plant investment and ginning volume, generally recognized as the principal factors contributing to the cost of ginning, were specified as the independent variables and annual cost as the dependent variable. The stepwise regression technique was employed to determine the relative influence of each of the independent variables, as well

as their combined effects, on the dependent variable. Findings from these analyses, using both total standardized costs and total costs, are summarized by area in table 10.

The coefficient of determination ( $R^2$ ) is an implicit indicator of the causal relationship between the independent variables and the dependent variable. The proportion of the variation in the dependent variable explained by the independent variables ranged from 96.3 percent for total standardized costs in West Texas to 87.7 percent for total cost in the Blacklands. Volume ginned was the most influential variable, coming in first in each of the six equations with  $R^2$  values ranging from 92.4 percent in the Lower Rio Grande Valley for total costs to 79.1 percent for total standardized costs in the Blacklands. The coefficient of variability, which is the standard deviation expressed as a percentage of the mean, was smaller for the total standardized cost equation compared to the total cost equation. This is as expected since the standardization procedure reduced the variations in both depreciation and interest rates found in the sample gin data.

Table 10--Ginning cost relationships, by area and costing method, Texas sample gins, stepwise multiple regression analysis 1/

Area and costing method <u>2/</u>	Constant a	Regression coefficients <u>3/</u>		Variation explained (R <sup>2</sup> )	Coefficient of variability <u>4/</u>	Variation explained by volume alone (R <sup>2</sup> )
		b <sub>1</sub>	b <sub>2</sub>			
		<u>Dollars</u>			<u>Percent</u>	
<u>Total standardized costs</u>						
West Texas.....	15,754	.160512	17.949	96.3	12.1	88.5
Lower Valley.....	12,374	.155760	14.779	95.2	12.8	88.0
Blacklands.....	6,086	.164882	16.738	91.2	12.6	79.1
<u>Total costs</u>						
West Texas.....	15,719	.101537	18.196	94.3	15.3	90.4
Lower Valley.....	13,791	.052828	16.733	93.6	14.9	92.4
Blacklands.....	2,384*	.103159	17.944	87.7	16.6	82.9

\* Significant at the 10-percent level; all other coefficients significant at the 1-percent level.

1/ Using weighted 1971 and 1972 sample gin data for each area.

2/ See costing methods in the appendix.

3/ The estimating equation is:

$$Y = a + b_1I + b_2V$$

Y = annual total standardized cost or total cost in dollars.

I = total investment in buildings and equipment in dollars.

V = annual volume ginned in bales.

4/ Standard deviation expressed as a percent of the mean.



## APPENDIX: METHODOLOGY

Gins vary widely by type of organization, ownership structure, accounting procedures used, and in many other ways. In analyzing costs reported by sample gins, uniform allocation procedures described below were employed to compensate for some of the differences in accounting procedures.

Costs of hauling cottonseed and lint--such as truckdrivers' wages, truck depreciation, insurance, road-use taxes, associated truck-operating costs, and any other cost not directly related to gin processing were excluded.

### Cost Allocations

Management: Where applicable, includes salaries, bonuses, commissions, expense allowances, house rent, and personal insurance policies for owners and managers; bookkeeping and other office salaries, and home office cost (line companies); social security; and workmen's compensation insurance and any other insurance on management and office personnel.

Depreciation: Includes allowances for depreciation exactly as carried on gin records except for standardized costs. (See standardized sample gin costs below.)

Interest: Includes interest exactly as carried on gin records except for standardized costs. (See standardized sample gin costs below.)

Insurance: Includes costs of all forms of insurance on gin buildings, equipment, housing furnished management and labor, cotton products, and automotive equipment (except large trucks and trailers).

Taxes: Includes all taxes on real property only.

Energy: Includes cost of all utilities--electricity, gas, and water--used in ginning and directly related operations.

Labor: Includes cost of gin wages, social security, and workmen's compensation and any other insurance on gin labor borne by the gin; plus any rental housing furnished labor (excludes gin repair labor; see repairs below).

Bagging and ties: Includes actual cost of bagging and ties purchased.

Repairs: Includes cost of gin repair wages, social security, and workmen's compensation and other insurance on gin repair labor borne by the gin, plus the cost of repair materials and supplies.

Miscellaneous: Includes pickup, tractor, and other automotive expenses; telephone, telegraph, advertising, and promotion costs; legal and audit fees; dues, memberships and subscriptions; annual meetings and director's fees and expenses; conventions and travel expenses; donations and contributions; cotton losses from fire; sampling, compressing, and related charges; gin and office supply costs; and any other costs not included elsewhere.

## Costing Methods

Sample gin costs: Gin costs which have been subjected to the above allocations are identified in this report as sample gin costs.

Standardized sample gin costs: Uniform rates for computing depreciation and interest on investment were used in developing standardized sample gin costs. Depreciation was set at 7 percent of the initial purchase price of capital items carried on the depreciation schedule regardless of age or former method of depreciation. Interest was charged at 8 percent on the estimated average value of land comprising the gin site and 8 percent on one-half the cost of buildings, machinery, and equipment.

Out-of-pocket costs: Sample gin costs from which depreciation and interest have been excluded.

## Cost Adjustments

Estimates of ginning costs at other than existing levels of capacity utilization were based on relationships assumed in the development of a series of model gins. See: Zolon M. Looney and Charles A. Wilmot, Economic Models for Cotton Ginning, U.S. Dept. Agr., Agr. Econ. Rpt. 214, Oct. 1971.

## Weighting

In computing weighted averages, the simple weighted average cost per bale for each group was further weighted by its representative proportion of the total rated hourly ginning capacity in that area. This was done to reflect more accurately the cost of ginning an "average" bale of cotton in each area.